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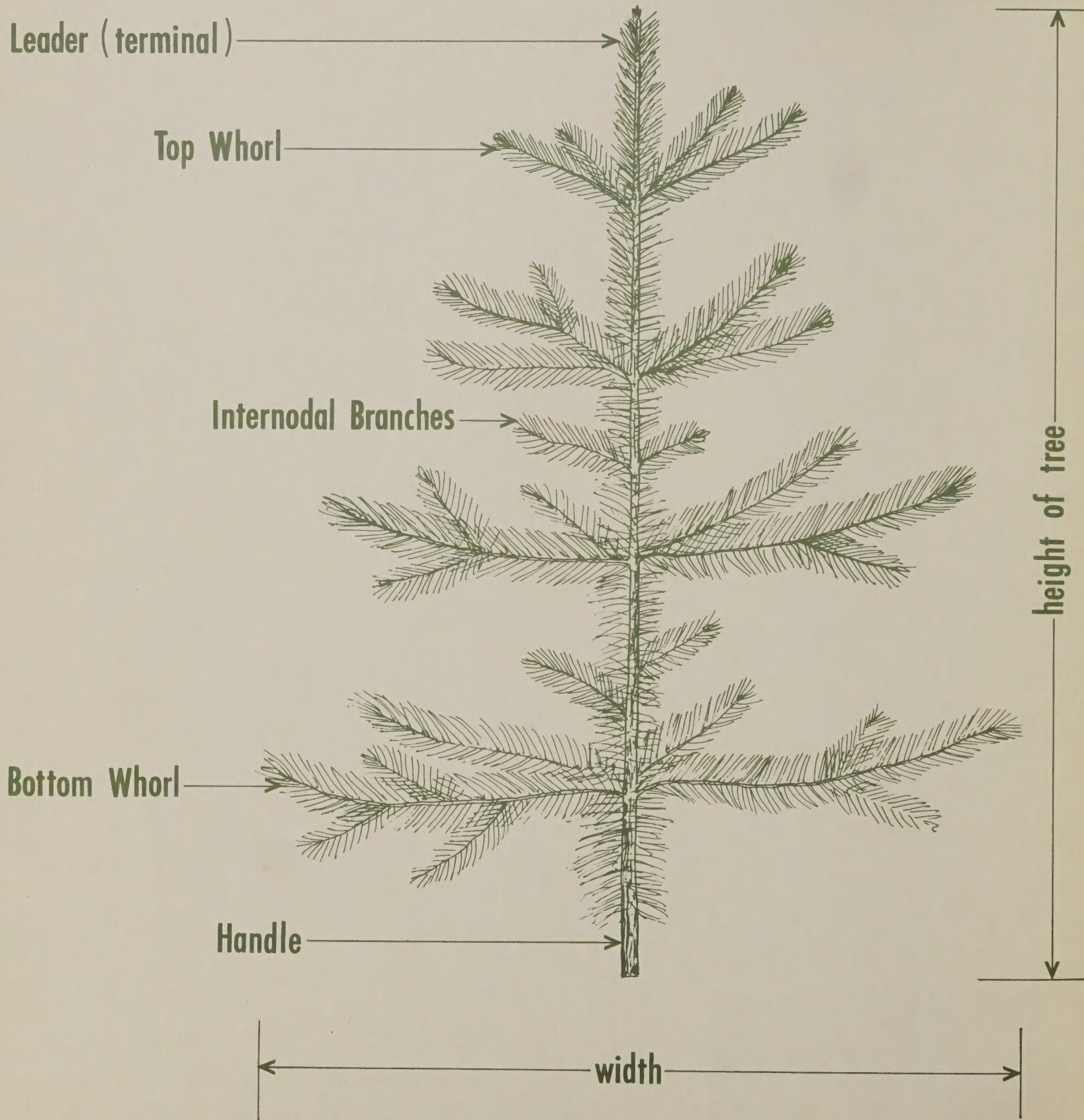


HOW TO GROW CHRISTMAS TREES IN THE SOUTH



U. S. DEPARTMENT OF AGRICULTURE
Forest Service · Southeastern Area · State and Private Forestry

Christmas tree terminology



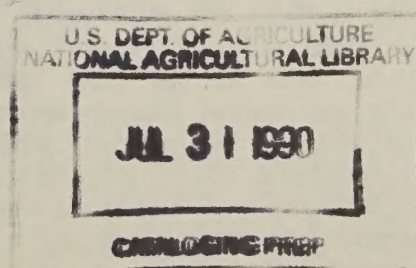
HOW TO GROW CHRISTMAS TREES IN THE SOUTH

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HOW TO GROW CHRISTMAS TREES IN THE SOUTH

INTRODUCTION

The South is a Christmas tree importing area. Demand for plantation-grown, quality Christmas trees is strong, and future demands look even stronger as the population rises and becomes more affluent and discriminating.

Why hasn't the South met its Christmas tree needs? For several reasons: First; the industry developed near wild trees: the North and Northwest. Second; it was difficult to find species that consumers preferred that would thrive in the South. And last; most southern forest-land owners and foresters are timber-oriented by background, education, and experience.

Today the necessary knowledge and information is available to enable an interested person to grow Christmas trees in the South. This booklet will help such a person enter the commercial Christmas tree business, or guide the hobbyist in growing trees for his own enjoyment.

SPECIES WORTH CONSIDERING

The most important basic point is to choose a species that will 've in a particular climate and soil. Consumer preference for blue spruce is of no importance if you can't grow it because of climate or soil. In making a choice of species one should consult local foresters, agricultural workers, and nurserymen for advice. Use their recommendations; then start small until the species chosen proves successful. Later, expand to your optimum-size operation.

Species preference of the consumer must be considered. Determine this by visiting local retail outlets and by reading consumer preference studies. Two studies (How Ohioans Choose Their Christmas Trees and Marketing Christmas Trees in Missouri) found Scotch pine the most preferred. The latter study found that some people praise Arizona cypress, white pine, and Norway spruce. Nationwide, the pines (primarily Scotch) are increasing in popularity. The true firs, Douglas-fir and spruce production are remaining constant. The National Grand Champion Christmas Tree in 1968 was a white pine; in 1969 it was a blue spruce. Most entries in the national competition are Scotch pine and Douglas-fir.

An examination by the authors of retail yards in Memphis, Tennessee, in 1968 and 1969 revealed that balsam fir, Douglas-fir, and Scotch pine each occupied 25% of the cut tree market. Norway spruce and red cedar each held 12% of the market, while Austrian pine held the remaining 1%. White pine was the most popular live Christmas tree, but there were no cut trees of this species in the markets visited.

Table I summarizes the results from which the U. S. Forest Service at Oxford, Mississippi installed in 1966 a Christmas tree species selection demonstration area. These results have limited use but Christmas tree growers in the southern part of the plant hardiness zone 7 and the northern part of zone 8 could benefit from these findings (see Plant Hardiness Map).

Table 1: Number of Surviving Seedlings Out of 99
Planted in Spring of 1966

Species	Year			
	1966	1967	1968	1969
1. Quadarama Scotch pine	86	82	82	79
2. Selected Scotch pine	75	73	71	70
3. D/Auvergne Scotch pine	66	61	61	61
4. White pine	64	62	58	58
5. Red cedar	75	73	58	57
6. Austrian pine	60	55	51	50
7. Arizona cypress	31	24	14	14
8. Norway spruce	8	8	3	3
9. Sand pine	13	9	3	1
10. Mexican cypress	57	4	0	0
11. Mexican border pine (planted 3/67)		75	53	47

Survival of 50-70% at the end of the first growing season may be adequate. As a rule the grower accepts a lower rate of survival on high-priced species because of the greater income at harvest. The Norway spruce survival was surprisingly low since one of the authors planted 500 seedlings in 1962 with a 70% survival. Many nursery plantings in the mid-South area have a 50 to 80% survival. Norway spruce demands a moist, well-drained site. The soil in the Oxford test was sandy, poor, and dry. Sand pine and Mexican cypress are not tolerant of severe winters. Oxford is definitely too far north for both these species. Border pine is acceptable and has good potential. Its survival is adequate, its growth is slow (6" to 12" per year), its form is dense and compact because of its slower growth and since it holds its 2 and 3-year-old needles. This latter characteristic distinguishes it from white pine.

The successful Christmas tree grower finds the ideal species for his area, market, and soils while staying constantly informed of the results with new and different species through association with other growers, foresters and research centers.

Growers should get seedlings from state-owned nurseries, or from commercial nurseries. Seedling cost varies from \$5 to \$40 per thousand, depending on species, size, and source. The 31 species listed in the following chart have been considered for planting in various locations in the South. Some of them are untried, and many that have been tried are not recommended. If a grower chooses to try species that are not recommended as desirable or acceptable on the chart, he should do so on a small scale. With these precautions in mind, use of this guide should prove beneficial to serious tree growers or the hobbyists.

PLANTING SITE SELECTION

Almost any well-drained site with a minimum of 2 inches of topsoil is suitable for Christmas trees. Deeper soils insure more vigorous growth, which can be disadvantageous with some species. Avoid lowland areas, floodplains, or upland areas with poorly drained subsoils. Abandoned fields or cutover lands can be used, but best production will be realized on moderately fertile lands. Christmas trees are often grown on sloping lands. While this normally offers good returns on unproductive soils, the grower is often faced with erosion problems. Fertile agricultural lands insure good tree growth; however, they increase weed problems. Avoid pure clays and sands. Sandy loam soils tend to minimize management problems because they support less weed growth and permit easier movement of vehicles.



Hand-spraying a mowed planting area in the Spring with aminotriazole to control young weeds. Strips are planted after a short waiting period.

PLANTING

Existing vegetation must be destroyed before seedlings are planted. This can be done by bush-hogging, discing, burning, application of chemicals or combinations of these methods. Spacing of the trees will vary considerably with site, species, and ownership. Relatively close spacing is desirable for maximum use of large area, but most growers use a network of lanes for fire protection, spraying, harvesting, and shearing operations. A 6'x6' spacing (1,210 trees per acre) will permit most trees to reach a merchantable height before crowding.

Most Christmas tree spacings permit between 1,000 and 2,000 trees per area. (For example: $6' \times 6' = 36$ square feet; $43,560 \div 36 = 1,210$ trees per acre). Any spacing closer than $4' \times 4'$ is not recommended. Spacing should be wide enough for the full development of the trees and should permit mowing or spraying for the entire rotation.

In handling the planting stock, it is very important that the roots are not damaged and do not dry out. The planting holes or slits should be sufficiently deep so that the roots of the seedlings are not bent when placed in the ground. Plant the seedling so that the bulbous root collar is level with or one-half inch below ground level. Pack the soil around the roots to insure proper contact of soil and roots. Place the



Seedlings planted with a dibble is best done by putting the bar behind the hole and holding seedling while twisting the dibble. A bag to carry the seedlings helps planting production.

seedlings straight up in the ground to permit development of straight trunks and crowns. To insure proper spacing between rows, use a string or lister.

FERTILIZATION

Check with the state forestry organization or extension agents for soil-testing and fertilization recommendations.

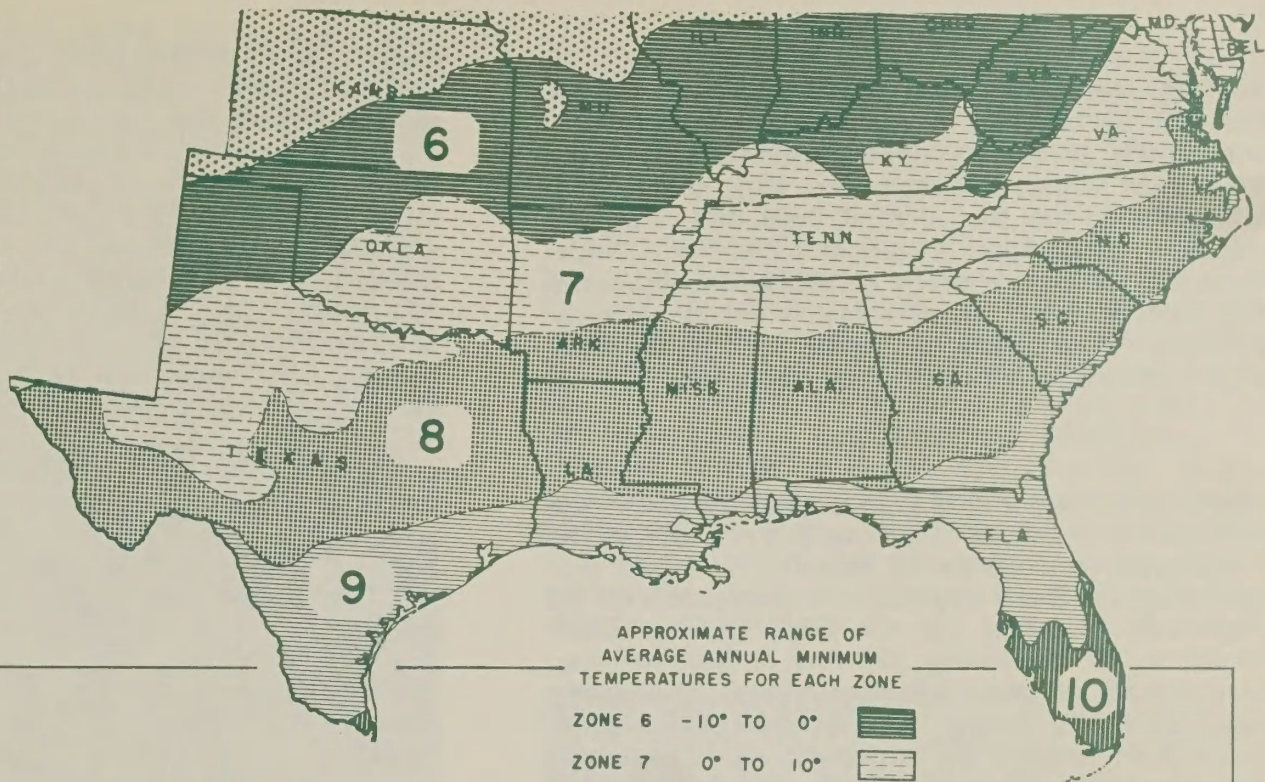
If your trees show poor color, short needles, slow growth, and early needlefall, the soil may have a nutrient deficiency. The above symptoms can also be caused by insects or disease damage, water deficiencies, or a poorly developed root system.

SPECIES WITH CHRISTMAS TREE POSSIBILITIES



Desirable	P - Poor L - Light F - Fair M - Medium G - Good H - Heavy	Live Christmas Tree suitability	Needed Shearing	Rotation Years	Droughty Soil	Basic Alkaline Soil	Rich, well drained Soil
Acceptable							
Not Recommended							
Hobbyist							
SCIENTIFIC NAME	COMMON NAME						
Abies fraseri	Fraser fir	G	L	11			X
Picea abies (excelsa)	Norway spruce	G	L	8			X
Pinus strobus	Eastern white pine	G	M	7		?	
Pinus sylvestris	Scotch pine	F	M	7	X		
Juniperus virginiana	Eastern red cedar	P	H	7	X	X	
Pinus clausa	Sand pine	P	H	4	X		
Pinus echinata	Shortleaf pine	P	H	7	X		
Pinus glabra	Spruce pine	P	H	6			
Pinus nigra	Austrian pine	F	M	7		?	
Pinus virginiana	Virginia pine	F	H	5	X		
Cupressus arizonica	Arizona cypress	P	H	4			
Cupressus mexicana	Mexican cypress	P	H	4			
Pinus taeda	Loblolly pine	P	H	5	X		
Abies chephalonica	Greek fir	G	L	14			X
Abies concolor	White fir	G	L	10			X
Abies homolepis	Nikko fir	G	L	12			X
Abies lasiocarpa var. Arizonica	Corkbark fir	G	L	12			X
Abies nordmannianna	Nordmann fir	G	L	12			X
Abies religiosa	Sacred fir	G	L	12			X
Cedrus atlantica	Atlas cedar	F	M	8			
Cedrus deodara	Deodara cedar	G	H	6			
Cedrus libani	Cedar of Lebanon	F	M	8			
Ilex opaca var. fosteri	Foster holly	G	M	7			X
Picea pungens	Colorado blue spruce	G	L	11			X
Picea omorika	Serbian spruce	G	L	11			X
Picea orientalis	Oriental spruce	G	L	11			X
Pinus ayacahuite	Mexican white pine	F	M	8			
Pinus peuce	Balkan pine	M	L	10	X		
Pinus flexilis var. reflexa	Border white pine	G	M	7			
Pseudotsuga taxifolia	Douglas-fir	G	M	9			X
Tsuga caroliniana	Carolina hemlock	F	M	8			X

U.S.D.A. PLANT HARDINESS ZONE MAP



Zone-Range	GENERAL COMMENTS
6 6,7 6,7,8 6,7,8	Grow at 2000' elevation or higher. Soil pH of 3.0 to 4.0. Easiest spruce to grow. Loses needles quickly when cut. Easy to grow and shear. Needs marketing. Increasing in popularity. Number one in USA. Use Mediterranean seed sources. Keen competition.
6,7,8,9 9,10 6,7,8,9 8,9 6,7,8 6,7,8,9	Difficult for cultivated trees to compete with wild cedar. Not cold-hardy. Used in Florida. Conduct small tests until proven. Need better shearing techniques and improved genetic material. Tolerates shade and excess water. Has potential for this reason. Coarse, stiff, sharp needles. Difficult to handle. Has potential. Grown in Louisiana. Avoid wet soils.
8,9 8,9,10 6,7,8,9	Loses needles quickly. Too columnar. Has retarded the Christmas tree industry. Not cold hardy. Too columnar. Poor survival. Better shearing techniques and improved genetic material hold key to its acceptance.
6 6,7 6,7,8,9 6,7 6 6,7 7,8 7,8,9 6,7 7,8,9 6,7 6,7 6,7 7,8,9 6,7 6,7,8 6,7 6,7	Growing in Knoxville, Tennessee. Failed in west Tennessee and south Arkansas. Tolerates more heat than any other American fir. Growing in Mobile, Alabama; Oxford, Mississippi and Memphis, Tennessee. Untried in mid-South. Grows in Arizona and New Mexico. Conduct small test. Untried in mid-South. Grows in Middle East. Conduct small tests until proven. Untried in mid-South. Grows in Mexico and Guatemala. Conduct small test until proven. Scarce ornamental. Stickly foliage. Limber branches. Popular ornamental. Called California Christmas tree. Historically valuable. Ornamental and scarce. Demand high because of color, red berries and shape. Expensive to grow. Premium species because of unusual blue-green color, and shape. Unusual, ornamental. Expensive to grow. Expensive to grow, outstanding color and shape. Untried in mid-South. Conduct small tests until proven. Could serve as So. White Pine. Native of Greece and Yugoslavia. Conduct small test until proven. Untried in South. Excellent promise. Holds 2 and 3 year needles. Growing in Mississippi and Tennessee. Seed source critical in mid-South. Conduct small tests until proven. Limber foliage. Valuable as an ornamental.

WEED CONTROL

Weeds, grasses and woody vegetation compete with the trees for soil moisture, nutrients, and growing space. Competition stunts growth and deforms or kills trees; being most serious on better sites. Most competition will occur in the first 2 or 3 years after trees are planted. Keep competing vegetation below 6". Competition may be controlled by cultivation: mowing and herbicides ^{1/}. Users should carefully follow the manufacturer's instructions to avoid damage to other plants, animals, fish, humans, and equipment.

PROTECTION

Fire is probably the first item to consider in the protection of a plantation since one fire can destroy the entire crop in a matter of minutes. The best protection against fire is a system of fire lanes around the plantation. Maintain the fire lanes with a winter covercrop, or by disking, plowing, or bush-hogging. Care should be taken while working in the plantations, especially during the fire season. The owner should keep fire-fighting tools handy and instruct his employees in their use. Tree growers should become acquainted with the agency responsible for fire control in the area.

Christmas trees are subject to attack by various insects and diseases. Most of the various moths, weevils, aphids, and sawflies that attack the common species of Christmas trees are controlled by insecticide applications.

The use of chemicals should be limited, and must be applied with care and proper supervision. Growers should check with the local agricultural or forestry agencies to determine the common insect and disease threats in the area, and take recommended measures to prevent losses.

Livestock can cause heavy loss to tree crops by browsing and trampling. Growers need to have an understanding with local farmers and ranchers concerning their livestock. In some cases, it may be necessary for the grower to construct fences to protect his plantation. Wildlife may also damage trees in the seedling stage. Most damage will probably occur in winter when the animals' natural foods are scarce. Deer browse on the seedlings; rabbits nip or girdle trees. Wildlife is less apt to damage a "clean" plantation, one that is relatively free of weeds or brush. If damage becomes excessive, seek help from local game officials.

^{1/} Recommendations for use of herbicides are reviewed regularly. Check with your local forester, county agent or state agriculture experiment station to determine current recommendations.



This 5-year-old white pine has a gooseneck resulting from excessive growth in the 4th year. Shearing as indicated will maintain one leader while increasing side branches.

SHAPING AND SHEARING

Few trees grow naturally into a desirable Christmas tree form. Generally the ideal tree is cone-shaped with the base about two-thirds of the height. Acceptable standards for taper range from 40 to 90% (see chart in appendix). To achieve the desired taper with a single main stem and desirable fullness, shape by pruning and shearing. Shearing is cutting back the current year's growth of the leader and the laterals. Pruning is removal of undesirable wood older than a year, such as diseased, dead, or damaged wood or forks.

Start shaping the third or fourth year after planting or when the trees average 2 ½ feet in height. This first shaping consists of a pruning to remove forks and some slight shearing on precocious leaders. The next year shear the terminal to 10" to 12" with a 45° angle cut. Shear the laterals to about two-thirds the length of the terminal. Repeat this operation until the tree reaches a marketable height. In the year in which the trees will be harvested, shear only lightly to maintain form.

Spruces, Douglas-fir and the true firs grow in late spring and early summer. The new growth is covered with buds that will become limbs the following year. Shear in late summer, fall or winter; timing is not critical. Hold terminal growth to 14 to 16 inches. Cut about one-half inch above bud, on both terminal and the laterals.

White pine, Scotch pine, and Austrian pine make a single flush of growth in late spring. The new growth has buds at only the tips of the new shoots. Cut the terminal to 12" or less, with a 45° angle cut. Cut the laterals to two-thirds the length of the terminal. Make lateral cuts parallel to the sides of the tree. Shear when the needles on the new growth are half the length of the old needles — usually the last two weeks in May and the first week in June. Scotch pine can be sheared a week later than Austrian pine which can be sheared a week later than white pine. The shearing season lasts 2-4 weeks for each species.

If shearing is done too early the tree will continue growing and not set buds at the cut point. If shearing is too late the resulting buds will be few and weak. Proper shearing will control the distance between branching while increasing the number of buds (next year's limbs) 3 to 6 times.

Virginia, sand, shortleaf, loblolly, and spruce pines, and holly must be shaped several times during the growing season. Shear the new growth before it hardens. Use the same principles as described with the spruces and firs, but don't expect as good bud-sets. Year-long growers include the true cedars, red cedar, hemlock and the cypresses. Shear these any time. They may be sheared 1 to 5 times per year. Shearing knives, hedge shears, and hand clippers are the most popular tools.

HARVESTING

The South enjoys good weather in early winter enabling the southern grower to postpone his harvest until late November and early December and insuring the consumer a fresher tree. (Almost all northern trees are cut by mid-November; some early in October.)

Producer should inventory and mark the trees for sale in late summer or early fall, listing them by grade and height. Inventory lists should be kept separate by fields and tracts.

Almost all Christmas trees are harvested with some kind of saw. The most popular is the small bowsaw. The power driven circular saw mounted on the end of a boom is gaining in popularity for large operations. Cut the trees with a smooth square butt to eliminate the need for recutting or downgrading.

If the cut trees are to be transported, they should be bundled. Bundling may be done by hand (using baling twine) if there are only a few hundred trees. A tapered 55 gallon drum welded to a stand is an inexpensive aid of bundling small batches. Automatic balers are available for large growers. Plastic mesh is also being used to wrap individual trees, providing a convenience to the consumer.

MARKETING

The retailing of Christmas trees starts around the last week in November and ends on December 24.

In order to compete in this fast moving business, the grower must provide: 1) a quality product, 2) a fair price, or 3) a special service. Southern grown Christmas trees can meet all these requirements.

A grower might sell his trees to a wholesaler, to a retailer, or directly to the consumer. Choice of marketing method depends on the size of operation, its location, the grower's opportunity to market his trees, his financial resources, and the risks he's willing to take. Generally, the small operator tends to retail his trees, the large operator wholesale them. The wholesale price is usually half the retail price. For example, consider a high-quality, four-foot Scotch pine; the grower sells it for \$1.00, the wholesaler for \$2.00, and the retailer for \$4.00. This is a much higher mark-up than is used for most businesses, but it reflects the perishable nature of the product, and the changing market demand.



Many live Christmas trees find their way into retail nurseries where they are sold as ornamentals and Christmas trees. This is a 7 foot white pine grown in west Tennessee.

The authors made a study of the retail market in 1968 and 1969 in Memphis, Tennessee, and as expected, the price varied according to grade, species and height of the individual tree. The average price was: Norway spruce, \$2.00/foot; Scotch pine, \$1.10/foot; Austrian pine, \$1.10/foot; Douglas-fir, \$.60/foot; red cedar, \$.60/foot; and balsam fir, \$.60/foot. Poor quality trees were the last to sell regardless of price. This again points out the importance of producing a quality Christmas tree. The above prices are approximations for two years in one city, but other southern urban markets are similar.

To summarize each of the marketing methods —

- selling to a wholesaler brings the smallest price, but entails the least amount of time, risk, and expense.
- selling to a retailer brings more money, but generally demands more capital and labor to cut and haul trees to the market place.
- selling directly to the consumer offers the greatest profit. Here trees may be marketed at the plantation where the consumer selects his own tree, cuts it, and takes it home. Growers located near urban centers may find this very profitable if proper consideration is given to advertising, directional signs, parking facilities, and supervision of sales. In addition, a grower may operate his own retail lot or allow a civic club or similar group to operate the yard on a commission basis.

Live Christmas trees are becoming quite popular and afford the grower an additional outlet for his trees. Here the tree is dug, placed in a container, and used as a conventional Christmas tree. After Christmas the tree is planted in the yard as an ornamental. This type of tree naturally commands a premium price. Many Christmas trees species are desirable ornamentals and can be sold to nurseries and landscape companies. (Refer to Species Selection Chart.) Check with the local plant board for a license to sell live trees.

Trees from 5 to 7 feet are most in demand, and the Christmas tree operation should be geared to marketing at this size.



Scotch pine - U.S. No. 1



Scotch pine — U.S. Premium



Scotch pine — U.S. No. 2

Photos courtesy - University of Missouri - School of Forestry

GRADES

The U. S. Department of Agriculture established three standard grades for Christmas trees: U. S. Premium, U. S. No. 1 (U. S. Choice), and U. S. No. 2 (U. S. Standard).

Table 2 is a condensation of the U. S. Standards for Christmas Trees. Growers may secure a copy of the complete grades by writing for the publication, "United States Standards for Grades of Christmas Trees," Washington, D. C. 20250.

REGENERATION

When all the merchantable Christmas trees are harvested from a block, regenerate by replanting or by stump culture. Most growers replant to get a second crop of trees.

First, cut and burn all unsalable trees, greenery, and other woody growth left in the block. Plant seedlings between the rows of stumps left from the previous crop of trees. Weed control with chemicals and mowing will be necessary to insure proper development of the new trees.

In stump culture the grower must leave 2-4 lower branches when harvesting the trees by cutting a high stump. In July, when these branches have begun to turn upward and enlarge, remove all but the best branch. This branch then develops into a new tree. Stump culture requires more frequent pruning (which increases production costs) and frequently produces a poor-quality tree. It is therefore not generally recommended.

TAXATION

A Christmas tree grower, like any other businessman, should keep accurate records. These are necessary to determine the profit and to report income and expenses for Federal and state taxes.

Any cut trees older than 6 years from seed are reportable as a long-term capital gain if one has owned the trees for at least 6 months. He then pays tax on half the profit. (Subtract all pertinent expenses from the total income.) In no case can the tax exceed 25% of the net profit, or you can write off (report, claim, or deduct) your expenses the year they are incurred. The income from the sale of the trees is reported the year in which it occurs. Under this method you increase your taxes but postpone them. Remember, income from Christmas trees or other capital gains is worth about 108% to 250% of an equal agricultural or other ordinary income. Check with your lawyer, accountant, or forester for assistance and advice.

For additional information, write the U. S. Forest Service at Oxford, Mississippi, and request "Financial Returns from Pine Plantations in North Mississippi," "Income Tax in Timber Management," also "Timber Management Guide," and "The Timber Owner and His Federal Income Tax," Agriculture Handbook No. 274.

COST — INCOME

Cost items include: land preparation, planting, stock, weed control, shearing, protection, harvesting, and interest on capital.

Income will depend on the method used to market the trees, quality of the trees, market conditions, and managerial ability of the grower.

The following analysis can be used as a guide to determine the costs and income a Christmas tree grower may expect to encounter in his operation. Several points should be kept in mind when considering this analysis:

- 1) *Land costs and property taxes were not considered since resale or development of the land will bear these costs. These costs exist whether the land is in Christmas trees, another use, or idle. These costs also vary greatly depending on whether the land is inaccessible land bought on yesterday's market or suburban land bought on today's market. Some people buy expensive suburban real estate and grow a crop of Christmas trees while waiting to develop it for commercial use. Land costs and taxes are borne by the commercial development and not the crop of trees.*
- 2) *The analysis assumes a wholesale type operation. A successful "choose-and-cut" or other retail type operation should yield greater income to the grower.*
- 3) *Equipment costs are shown as depreciation and assume ownership. The feasibility of equipment ownership will depend upon several factors which include size of plantation, type ownership, and other equipment requirements.*
- 4) *Protection costs are shown each year even though no costs may occur unless trees are damaged by rodents, fire, insects or disease.*
- 5) *Efficient operations will have lower costs; inefficient operations will have high costs.*
- 6) *Assumptions are shown on page 11 and the grower should change given assumption to conform to local situations.*

COST-AND-INCOME ANALYSIS

First Year Expenses

Item	Amount
Late summer mowing ¹	\$ 6.00
Chemical weeding ²	13.00
Interest @ 8%	<u>1.52</u>
	\$20.52
	\$20.52*

Second Year Expenses

Item	Amount
Buy 1200 seedlings ³	\$36.00
Planting @ \$20/M	24.00
Chemical weeding ⁴	11.17
Mowings (4/year) ⁵	24.00
Protection ⁶	10.00
Interest at 8%	<u>10.06</u>
	\$115.23
	\$135.75*

Third Year Expenses

Buy 350 seedlings	10.50	
Planting @ \$25/M	8.75	
Chemical weeding	11.17	
Protection	10.00	
Mowings (3/year)	18.00	
Interest @ 8%	<u>15.53</u>	
	73.95	209.70*

Fourth Year Expenses

Chemical weeding	11.17	
Mowings (3/year)	18.00	
Protection	10.00	
Shearing	16.00	
Interest	<u>21.19</u>	
	76.36	286.06*

Fifth Year Expenses

Chemical weeding	11.17	
Mowings (3/year)	18.00	
Protection	10.00	
Shearing ⁸	30.00	
Interest	<u>28.42</u>	
	97.59	383.65*

Sixth Year Expenses

Chemical weeding	11.17	
Mowings (3/year)	18.00	
Protection	10.00	
Shearing ⁹	37.00	
Interest	<u>36.79</u>	
	112.96	496.61*

Seventh Year Expenses

Chemical weeding ¹⁰	10.00	
Mowings (2/year)	12.00	
Protection	10.00	
Shearing ¹¹	50.01	
Interest	<u>46.29</u>	
	128.30	624.91*

Eighth Year Expenses

Chemical weeding	10.00	
Mowings (2/year)	12.00	
Protection	10.00	
Shearing ¹²	30.00	
Coloring (400 trees) ¹³	67.00	
Harvesting (400 trees) ¹⁴	<u>100.00</u>	
	297.31	922.22*

Ninth Year Expenses

Chemical weeding	10.00	
Protection	10.00	
Shearing ¹⁵	12.00	
Coloring (400 trees)	67.00	
Harvesting (400 trees)	100.00	
Interest	<u>89.70</u>	
	288.87	1210.92*

INCOME

Year No. 8 - Harvest 400 trees @ \$2.25 each (fob)	\$ 900.00
1 year interest @ 8%	72.00
	<u>\$ 972.00</u>
Year No. 9 - Harvest 400 trees @ \$2.25 each (fob)	\$ 900.00
1 year interest @ 8% for \$972.00 and \$900.00	149.76
	<u>\$1049.76</u>
Total income (includes 8% interest for years 8 and 9)	\$2021.76
Total expenses	\$1210.92
Net income	\$ 810.84
Net income/acre/year	\$ 90.09

*Cumulative expenses

ASSUMPTIONS

1. Depreciation and fuel — 1 hour	3.00
Labor — 1 man for 1 hour	3.00
2. Chemical weed control — spray with herbicide A	
Tractor and sprayer-band application	13.00
3. Seedlings \$30/M	
4. Spray with herbicide B	11.17
Tractor and sprayer-band application	
5. Labor — 1 man for 1 hour	3.00
Machine	3.00
6. Protection — .01/seedling/year	10.00
7. Labor \$3.00/hr. — from here on 1000 trees/acre	
Assume 1500 seedlings sheared or examined/8 hr. day	16.00
8. Labor \$3.00/hr. — assume shear 100 trees/hr.	30.00
9. Labor \$3.00/hr. — assume 80 trees/hr.	37.50
10. Back-pack pump and mineral spirits	10.00
Labor — \$5.00	
Material — \$5.00	
11. Shearing \$3.00/hr. — labor. Assume shear 60 trees/hr.	50.01
12. Shearing labor — \$3.00/hr. Assume shear 100 trees/hr.	30.00
13. Material: \$8.00/gallon; 200 trees/gallon;	
Labor \$3.00/hr. Assume 400 trees per day for	
2-man crew	67.00
14. Assume .25/tree for cutting, skidding, grading,	
packing, and loading on truck	
400 trees @ .25/tree	100.00
15. Shearing labor — \$3.00/hr. Assume 400 trees/acre	
Assume shear 100 trees/hr.	12.00

NOTE: Interest was charged for the full year on all expenses and incomes. This is a conservative approach since most expenditures occur in the summer which would result in carrying the money only about 6 months.

APPENDIX

Available Publications on Christmas Trees

- ALABAMA — Christmas Tree Production in Eastern Red Cedar and Arizona Cypress - Cir. 145, Nov. 1963, by George I. Garin, Auburn University, Auburn, Alabama.
- Observations on Species of Cypress Indigenous to the United States - Cir. 153, May 1967, by Clayton Posey and James Goggans, Experiment Station, Auburn, Alabama.
- ARKANSAS — Growing Christmas Trees in Arkansas - Leaflet 356 (Rev.) November 1967, by W. L. Smiley and Dean R. Wallace, University of Arkansas, Box 391, Little Rock, Arkansas.
- CONNECTICUT — Chemical Control of Weeds in Christmas Tree Plantings, by J. F. Ahrens, T. R. Flanagan, and M. L. McCormack, Jr., Bulletin No. 700, May 1969, Connecticut Agricultural Experiment Station, New Haven, Connecticut.
- FLORIDA — Growing Red Cedar in Florida - Cir. 183, March 1961, by L. T. Nieland and A. S. Jensen, University of Florida, Extension Service, Gainesville, Florida.
- Christmas Tree Production in Florida - To be released.
- GEORGIA — Christmas Trees - A Profitable Crop for Georgia, Bulletin 606, Rev. June 1965, by W. R. Murray, Extension Forester, University of Georgia, Athens, Georgia.
- Christmas Tree Taper Guide - Cardboard Taper Chart, Extension Service, University of Georgia, Athens, Georgia.
- LOUISIANA — Needle Retention of Five Species of Christmas Trees, LSU Forestry Note No. 67, August 1966, by Benton Box and Norwin Linnartz, Baton Rouge, Louisiana.
- Managing Virginia Pine for Christmas Tree Production in Louisiana, LSU Forestry Note No. 76, April 1968, by Benton H. Box and Rodney Foil, Baton Rouge, Louisiana.
- NORTH CAROLINA — Some Diseases of Christmas Trees - Sheet, Farm Forestry Facts, August 1965, by Fred Whitfield, Agricultural Extension Service, North Carolina State University, Raleigh, North Carolina.
- Growing Christmas Trees in North Carolina - Circular, March 1968, by Fred Whitfield, Agricultural Extension Service, North Carolina State University, Raleigh, North Carolina.
- SOUTH CAROLINA — Growing Christmas Trees in South Carolina - Circular 500, September 1965, by Extension Forestry Division, Clemson University, Clemson, South Carolina.

- KENTUCKY** — Christmas Tree Growers Service Letters, by J. A. Newman, Extension Service, University of Kentucky, Lexington, Kentucky.
- TENNESSEE** — Christmas Tree Production and Marketing in East Tennessee-EC 598, March 1962, by Thor, Britt, Catlett and Sharp, Agricultural Extension Service, University of Tennessee, Knoxville, Tennessee.
- Shape Christmas Trees for Profit, Publication 528, October 1965, by John Sharp and E. Thor, Agricultural Extension Service, University of Tennessee, Knoxville, Tennessee.
- TEXAS** — Texas Wholesale Market for Christmas Trees - B-1021, September 1964, by H. B. Sorensen and W. A. Smith, Texas A&M University, Agriculture Experiment Station, College Station, Texas.
- Growing Christmas Trees in Northeast Texas. TAP 315, March-April 1963, by H. F. Morris, reprint from Texas Agricultural Progress, Texas A&M Agriculture Information, College Station, Texas.
- MISSISSIPPI** — Marketing Potential for Mississippi Christmas Trees with Special Reference to Arizona Cypress - Bulletin 582, September 1959, Agricultural Experiment Station, Mississippi State University, State College, Mississippi.
- VIRGINIA** — Growing Christmas Trees in Virginia - Bulletin No. 296, June 1966, by A. B. Lyon and R. T. Marks, Extension Forester, Virginia Extension Service, Blacksburg, Virginia and E. E. Rodgers and A. L. Jolly, Foresters, Virginia Division of Forestry, Charlottesville, Virginia.
- OKLAHOMA** — Growing Christmas Trees in Oklahoma - October 1965 - OSU Extension Facts, 5001, by Max Craighead, Extension Service, Oklahoma State University, Stillwater, Oklahoma.
- U.S.A.** — Technical Manual for Christmas Tree Farmers - Editor, Dr. Harvey Stangel, Allied Chemical Corporation, New York, N. Y. Authors - Lester Bell and Donald White.
- Plant Hardiness Zone Map, Miscellaneous Publication No. 814, Agricultural Research Service, Superintendent of Documents, Washington, D. C.

Additional information may be obtained from —

- National Christmas Tree Growers Association, 225 East Michigan Street, Milwaukee, Wisconsin.
- Federal Extension Service, USDA, Washington, D.C.

GRADES

Grades for Christmas trees ~~were~~ developed by the Agricultural Marketing Service of the U. S. Department of Agriculture effective November 1, 1957. They are U. S. Premium, U. S. No. 1 or U. S. Choice, and U. S. No. 2 or U. S. Standard. Any tree which will not qualify for any of these grades is considered a cull.

A condensation of the U. S. Standards for Christmas Trees is listed below:

TABLE 2			
FACTOR	U. S. PREMIUM	U. S. NO. 1	U. S. NO. 2
Density	Medium density (based on characteristics of the species)	Medium density (based on characteristics of the species)	Light density
Taper	Normal for the species	Normal (flaring or candlestick permitted if tree is otherwise U. S. Premium)	Normal (flaring or candlestick permitted if tree is otherwise U. S. No. 1)
Balance	4 complete faces	3 complete faces	2 complete faces
Foliage	Fresh, clean, healthy, well trimmed	Fresh, clean, healthy well trimmed	Fresh, fairly clean, and free from damage
Deformities	Not more serious than minor	Not more serious than minor (noticeable deformities permitted if tree is otherwise U. S. Premium)	Not more serious than minor (noticeable deformities permitted if tree is otherwise U. S. No. 1)

Taper — This expresses the relationship of the width of the tree to its height. The percent of taper is determined by dividing the width of the base of the tree by the height and multiplying by 100.

Density — This is an expression of the amount of foliage and is influenced by the number, size, and arrangement of branches. Different species have different branching habits and density must be judged on the basis of species characteristics.

Balance — “Balance”, or the overall structure of the tree, must be considered on the basis of species characteristics. Faces are judged by dividing the tree into one-quarter segments by eye, thereby forming four faces.



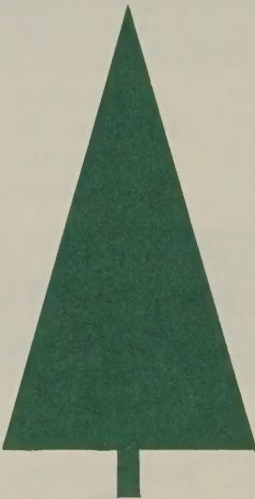

Fresh — Needles are pliable, turgid, and firmly attached with only slight amount or no shattering.

Clean — The tree is practically free of moss, lichens, vines, or foreign materials.

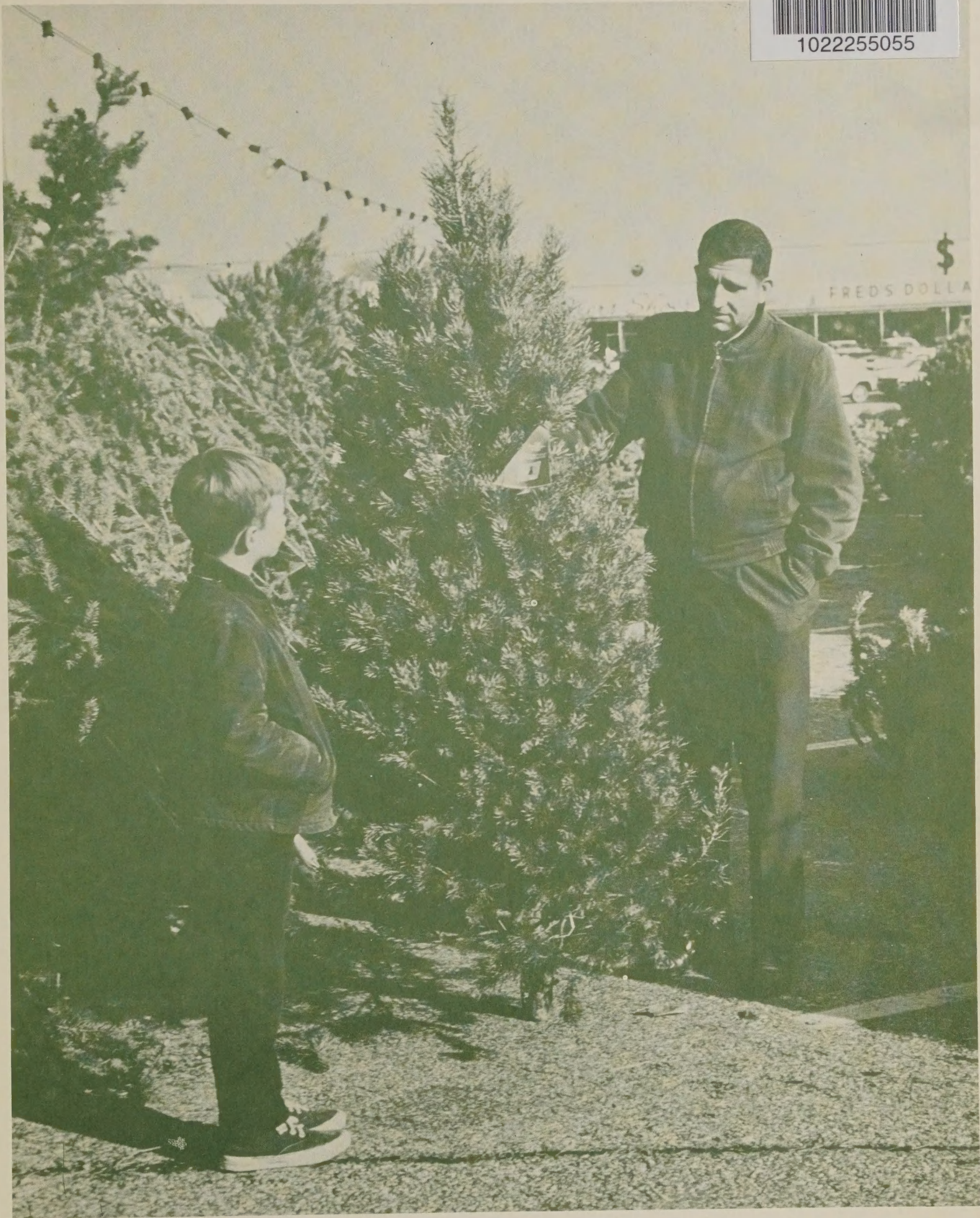
Fairly Clean — The tree is moderately free of moss, lichens, vines, or other foreign materials.

Healthy — The foliage possesses a thrifty, fresh, natural appearance characteristic of the species.

Damage — “Damage” includes defects which materially affect the appearance of the foliage such as noticeable galls, abnormal needle loss, and needle curling, noticeable dead twigs, and spotty appearance due to areas of dead needles.

40% Minimum Acceptable Taper	66-2/3% Ideal Taper (All Species)	70% Maximum Acceptable Taper (For spruce and fir)	90% Maximum Acceptable Taper (For pines)
			

Less than 40% — candlestick taper (undesirable);
 40% to 70% — normal taper (spruces and firs);
 40% to 90% — normal taper (pines);
 more than 70% — flaring taper (spruces and firs);
 more than 90% — flaring taper (pines).



Southern markets are excellent for quality Christmas trees.

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